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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,650	12/30/2003	Tae-Hee Park	20067/OPP031479US	9404
34431	7590	04/15/2005	EXAMINER	
HANLEY, FLIGHT & ZIMMERMAN, LLC 20 N. WACKER DRIVE SUITE 4220 CHICAGO, IL 60606			LEE, GRANVILL D	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 04/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/749,650

Applicant(s)

PARK, TAE-HEE

Examiner

Granvill D. Lee, Jr

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☒ Claim(s) 2-14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/5/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities: The paragraph beginning with "To whom it may concern...", is not needed and should be deleted. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. (US. Pat. 6,323,132) in view of Pu et al. (US. Pat. 5,843,847). Hwang et al. discloses a method for forming a metal line or circuit element in a semiconductor device (Col. 16 lines 1-5), the method comprising: forming a lower adhesive layer (Fig. 6 #14) consisting of titanium or titanium nitride on a semiconductor substrate (Col. 16 lines 32-40); forming a metal layer (#16) including aluminum (Col. 23 lines 15-20) on the lower adhesive layer; forming an anti-reflection or protective layer (#22) on the metal layer;

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forming a photomask (#18) on the anti-reflection layer; performing an initial etching (Fig. 8), a main etching (Fig. 9) and an over-etching (Fig. 16) for the anti-reflection layer (#22), the metal layer (#16) and the lower adhesive layer (#14), respectively (Col. 9 lines 20-50), in a region which is not protected (as shown) by the photomask, using C<sub>3</sub>F<sub>8</sub> as a main etching gas; and removing the photomask (#18) residual on the anti-reflection layer (Col. 16 lines 57-65).

Yet, Hwang et al. fails to suggest an etching gas of C<sub>3</sub>F<sub>8</sub> utilized as the main etching gas component for the number of etchings used. However, Pu et al. suggests that C<sub>3</sub>F<sub>8</sub> etching gas (Col. 5 line 60-Col. 6 line 10) can be easily used to etch materials on substrates, where selectivity is important.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the circuit element etching technique of Hwang et al. in favor of the C<sub>3</sub>F<sub>8</sub> etching gas method of Pu et al. with the idea of achieving better selectivity and etch rate results. Pu et al. sought a method where gas composition selectivity (Col. 1 lines 35-55) ratios were optimized, while still considering the high etch rates, and found that a balance could be met by using an etching gas of the group of CF gases including C<sub>3</sub>F<sub>8</sub> etching gas (Col. 5 line 55-Col. 6 line 25).

#### ***Allowable Subject Matter***

Claims 2-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for possible allowance: The prior art of record does suggest (i.e. Pu et al.) or discloses an etching gas to etch a metal layer to include N<sub>2</sub>, but the prior art fails to describe or suggest *inter alia* the invention of including C<sub>3</sub>F<sub>8</sub>, N<sub>2</sub> and NF<sub>2</sub> gases to etch a metal layer, as claimed. For these reasons, the claims cited define over the prior art. Any comments considered necessary by applicant must be submitted no later than the payments of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

**Contact Information**

Any inquiry concerning this communication or earlier communications for the examiner should be directed to Granvill Lee whose telephone number is (571) 272-1897. The examiner can be normally reached on Monday thru Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are not successful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for this group is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see

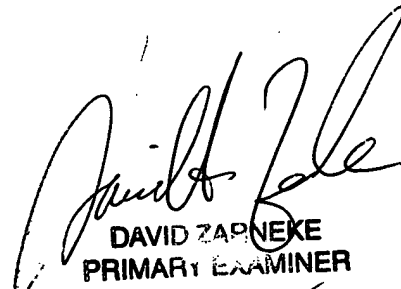
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<http://pair-direct.uspto.gov>. Should you have questions on access to the

Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner  
Granvill Lee  
Art Unit 2891

G1  
4/5/05

  
DAVID ZARNEKE  
PRIMARY EXAMINER  
4/13/05